

## CLAIMS

I claim:

1. An isolated polypeptide, comprising an amino acid sequence selected from the group consisting of: (a) amino acid residues 21 to 440 of SEQ ID NO:2, (b) amino acid residues 21 to 464 of SEQ ID NO:5, and (c) amino acid residues 462 to 674 of SEQ ID NO:2.

2. The isolated polypeptide of claim 1, comprising an extracellular domain, wherein the extracellular domain comprises either amino acid residues 21 to 440 of the amino acid sequence of SEQ ID NO:2 or amino acid residues 21 to 464 of the amino acid sequence of SEQ ID NO:5.

3. The isolated polypeptide of claim 2, wherein the polypeptide further comprises a transmembrane domain that resides in a carboxyl-terminal position relative to the extracellular domain, wherein the transmembrane domain comprises amino acid residues 441 to 461 of SEQ ID NO:2.

4. The isolated polypeptide of claim 3, wherein the polypeptide further comprises an intracellular domain that resides in a carboxyl-terminal position relative to the transmembrane domain, wherein the intracellular domain comprises amino acid residues 462 to 674 of SEQ ID NO:2.

5. The isolated polypeptide of claim 4, wherein the polypeptide further comprises a signal secretory sequence that resides in an amino-terminal position relative to the extracellular domain, wherein the signal secretory sequence comprises amino acid residues 1 to 20 of the amino acid sequence of SEQ ID NO:2.

6. The isolated polypeptide of claim 1, wherein the polypeptide has an amino acid sequence consisting of amino acid residues 21 to 440 of SEQ ID NO:2.

7. The isolated polypeptide of claim 1, wherein the polypeptide has an amino acid sequence consisting of amino acid residues 21 to 464 of SEQ ID NO:5.

8. An isolated nucleic acid molecule, wherein the nucleic acid molecule is selected from the group consisting of: (a) a nucleic acid molecule that encodes the amino acid

sequence of SEQ ID NO:2, (b) a nucleic acid molecule that encodes the amino acid sequence of SEQ ID NO:5, (c) a nucleic acid molecule encoding an amino acid sequence that comprises amino acid residues 21 to 440 of SEQ ID NO:2, and (d) a nucleic acid molecule encoding an amino acid sequence that comprises amino acid residues 21 to 464 of SEQ ID NO:5.

9. A vector, comprising the isolated nucleic acid molecule of claim 8.

10. An expression vector, comprising the isolated nucleic acid molecule of claim 8, wherein the nucleic acid molecule encodes an amino acid sequence comprising either residues 21 to 440 of the amino acid sequence of SEQ ID NO:2, or amino acid residues 21 to 464 of the amino acid sequence of SEQ ID NO:5, a transcription promoter, and a transcription terminator, wherein the promoter is operably linked with the nucleic acid molecule, and wherein the nucleic acid molecule is operably linked with the transcription terminator.

11. A recombinant virus, comprising the expression vector of claim 10.

12. A recombinant host cell comprising the expression vector of claim 10, wherein the host cell is selected from the group consisting of bacterium, avian cell, yeast cell, fungal cell, insect cell, mammalian cell, and plant cell.

13. A method of using the expression vector of claim 10 to produce a protein comprising an amino acid sequence that comprises either residues 21 to 440 of the amino acid sequence of SEQ ID NO:2, or amino acid residues 21 to 464 of the amino acid sequence of SEQ ID NO:5, the method comprising the step of culturing recombinant host cells that comprise the expression vector and that produce the protein.

14. An antibody or antibody fragment that specifically binds with the polypeptide of claim 1.

15. An anti-idiotypic antibody, or anti-idiotypic antibody fragment, that specifically binds with the antibody or antibody fragment of claim 14.

16. A composition, comprising a carrier and either the isolated polypeptide of claim 1, or at least one of an expression vector that comprises a nucleic acid molecule

17. An isolated polypeptide consisting of either residues 21 to 440 of the amino acid sequence of SEQ ID NO:2, or amino acid residues 21 to 464 of the amino acid sequence of SEQ ID NO:5.

19. An anti-idiotypic antibody that specifically binds with the antibody of claim 18.

20. A fusion protein, comprising the isolated polypeptide of claim 17 and an immunoglobulin moiety.